NASA Success Story

Automotive Thermal Protection Insulation

Thermal insulation blankets developed for use aboard the Space Shuttle are now protecting race car drivers against excessive cockpit heating. BSR-TPS Products, Inc. of Mooresville, North Carolina manufactures Thermal Protection System (TPS) materials for NASCAR drivers as a result of a Space Act Agreement with Boeing North America (formerly known as Rockwell Space Systems), participating as a NASA Kennedy Space Center (KSC) contractor. The BSR-TPS product is the first commercial use of Shuttle TPS insulation. It is also the first product to bear the Mission HOME (Harvesting Opportunity for Mother Earth) official seal, indicating that a product was developed directly from U.S. space program technology. Companies earn the right to use the certification seal by undergoing review by a panel of technology experts comprised of members of the U.S. Space Foundation, the National Space Society, and major aerospace companies. The original insulation blankets tested at Daytona worked very well, and were the state of the art from a thermal standpoint, but were not really durable enough to withstand the environment they were tested in. BSR changed the materials in order to increase durability and reduce cost. The fundamental design was unchanged. The entire blanket is less than 0.5 in thick, yet acts as a highly efficient thermal-radiation shield. To prevent the overheating of the exhaust pipes, the blanket is installed only over the top of the system, leaving the bottom exposed to airflow. It is made of metal, ceramic, glass, and is nonflammable.

NASA Involvement NASA's Space Shuttle Orbiters are subject to re-entry heat loads as high as 3,000 degrees F. Developed by Rockwell Space Systems, the TPS tiles and thermal blankets safeguard the Shuttles from excessive heat upon re-entry. The original effort to test the blanket insulation kits on a NASCAR auto was brought about by a Space Act Agreement between NASA/KSC and Penske Racing Inc. Rockwell Space Systems Division, participating as a NASA

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Prepared by Dynacs, Inc.
Success Story ID # 2022
August 2000

NASA Success Story

Automotive Thermal Protection Insulation (Continued)

contractor, agreed to design and install a Penske racing car with Space Shuttle Orbiter TPS blanket material. The idea of using TPS materials to insulate against excessive heating in the cockpit of a race car came about as a result of a tour taken by NASCAR champion Bobby Allison at Kennedy Space Center. Former KSC Director Jay Honeycutt suggested that TPS insulation materials could shield drivers from the internal high temperature of race cars. Bobby Allison contacted Roger Penske, who provided a race car in which the TPS insulation was installed. The TPS material was found to significantly reduce cockpit temperatures and the chance of serious injury to race car drivers.

Social/Economic Benefit Tests conducted at the Daytona Speedway resulted in significant temperature decreases in locations where the kits were installed. The exhaust pipes are routed so close to the sheet metal of the floor pan and transmission tunnel that a large portion of the heat radiated by the exhaust system enters the cockpit. A driver can sustain localized second- or third-degree burns. The insulating blanket kits manufactured by BSR-TPS Products lower temperatures by more than 40 degrees in the cockpit. BSR's thermal protection blankets are available for installation under the floor and seat, in the rocker panel and driver side door, and the exhaust and oil tank. The blankets are designed to be lightweight, and to provide maximum thermal protection to the driver in the event of a collision or fire. BSR-TPS Products states that over 90 cars and trucks in three different NASCAR series are using the TPS insulation kits. They are now introducing the kits into the SCCA (Sports Car Club of America), Offroad series, and airplane manufacturers. An expanded market is also being developed for the Experimental Aircraft Association. Insulation kits are manufactured for race car teams around the world.

Industry Partner
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